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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,742	10/30/2003	Shigetaka Kinme	1560-0400P	6192
2292 7590 07/19/2007 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER MILLS, DANIEL J	
			ART UNIT 3679	PAPER NUMBER
			NOTIFICATION DATE 07/19/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/695,742

Applicant(s)

KINME ET AL.

Examiner

Daniel J. Mills

Art Unit

3679

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 2-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 10-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>translation of JP2000297823</u> |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/19/2007 has been entered.

Election/Restrictions

Claims 2-9 stand withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species; there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamikawa et al. (Kamikawa JP2000297823).

Regarding claims 1 and 10-12 Kamikawa discloses a yoke-and-shaft coupling structure comprising, a yoke (3) including a shaft coupling portion which has a U-shaped end face (11), and a shaft (5) to be inserted into inside of the shaft coupling portion through a U-shaped opening portion, wherein the shaft coupling portion includes a recessed portion (10) for positioning the shaft in both axial directions (the front wall and inclined rear wall providing limits to axial movement), and the shaft includes a salient portion (13 and 15) to be inserted into the recessed portion when the shaft is inserted into the inside of the shaft coupling portion, wherein the shaft is shiftable between assembled and disassembled positions.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClanahan et al. (McClanahan US 5,628,578).

Regarding claims 1 and 10-12 McClanahan discloses a yoke-and-shaft coupling structure comprising, a yoke (14) including a shaft coupling portion which has a U-shaped end face (52), and a shaft (12 and 16 form the shaft) to be inserted into inside of the shaft coupling portion through a U-shaped opening portion, wherein the shaft coupling portion includes a recessed portion (the area of the inner wall between 68 and

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70) for positioning the shaft in both axial directions, and the shaft includes a salient portion (the area of 24 between 42 and 44) to be inserted into the recessed portion when the shaft is inserted into the inside of the shaft coupling portion, wherein the shaft is shiftable between assembled and disassembled positions.

Assuming *arguendo* that 12 and 16 do not form the "shaft", it would have been an obvious engineering design choice for one of ordinary skill in the art at the time of applicants' invention, to assemble 12 and 16 prior to assembly with the yoke such that the "shaft" would be constituted by both 12 and 16, for the purpose of allowing easy variation in the assembly steps of coupling (i.e. if these separate parts were dropped on the ground it would be obvious to anyone to assemble 12 and 16 into a "shaft" before inserting the shaft into the yoke).

Response to Arguments

Applicants' arguments filed 3/19/2007 have been fully considered but are not persuasive.

Applicants argue that Kamikawa fails to anticipate that the recessed/projecting portions are capable of positioning the shaft in both directions along the axis of the shaft. This is not persuasive, as Kamikawa discloses a recessed portion which fully constrains the movement of the shaft along its axis. As shown in Figure 1, the projecting portion (13) is prevented from moving forward (to the left side of the Figure) by the end wall, and is prevented from moving backward by the incline of the bottom wall of the recess (note that the "incline" has a relatively gentle slope just behind 13).

The incline forces any backward movement to be out of alignment with the axis of the shaft (as is in the case of applicant's invention).

Applicants argue that McClanahan fails to disclose one of a fixed projecting portion and a recessed portion of the shaft coupling portion position the shaft in an axial direction in both directions along the axis of the shaft. The interpretation of McClanahan as set forth in the present rejection sets forth the area of 24 between 42 and 44 as the salient or projecting portion and the area of the inner wall of the yoke between 68 and 70 as a recessed portion. When assembled, the interaction of these structures prevents any purely axial movement of the shaft. Applicant's argue that this interpretation is incorrect based on "ordinary meaning" of these terms. This is not persuasive, as applicant has failed to establish how the ordinary meaning" of these terms contradicts examiner's interpretation. Further, it is apparent that the surface of 24 projects above the surface of 42 and 44, while it is also apparent that the inner wall of the yoke is recessed with respect to the surfaces of 68 and 70. Applicant is attempts to establish the "ordinary meaning" of these terms with respect to one perspective, when in fact the alternative perspective is equally valid.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. A machine translation of JP2000297823 is included with this action for applicant's convenience.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Mills whose telephone number is 571-272-8115. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached on 571-272-7087. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DJM

DJM
7/8/2007



**GREGORY J. BINDA
PRIMARY EXAMINER**

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the geometry of the shaft applied to a universal joint, and a yoke.

[0002]

[Description of the Prior Art] In the geometry of the shaft in the conventional, for example, steering, fastener, and a yoke, after making a shaft slide to shaft orientations and inserting it into a yoke, there are some which combine a yoke and a shaft in total about the bolt made to insert in a yoke in the direction of a path.

[0003] Moreover, as shown in drawing 5, there is also geometry of the shaft which is made to slide a shaft 71 in the direction of a path from an axial right angle to a yoke 72, and inserts it into a yoke 72, and a yoke.

[0004] However, in the latter geometry, an operator needs to hold the fitting condition of a shaft 71 and a yoke 72, and there is a problem that workability is bad until it binds this bolt tight since a clamping bolt (not shown) is made to insert in the boltholes 73 and 75 of a yoke 72 after carrying out fitting of the shaft 71 into a yoke 72.

[0005] Moreover, there is also a possibility of the axis of a shaft 71 and a yoke 72 shifting, or inclining by the time it binds a bolt tight.

[0006]

[Problem(s) to be Solved by the Invention] Then, the object of this invention has good workability and it is to offer the geometry of the shaft in which exact attachment is possible, and a yoke.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned object, the shaft of invention of claim 1, and the geometry of a yoke The yoke which has the axial insertion section and the pin receptacle section of the cross-section the configuration of U characters in which direction one side of a path is carrying out opening, It is the geometry of a shaft and a yoke equipped with the shaft inserted in the above-mentioned axial insertion section. It tapers off toward a pars basilaris ossis occipitalis from the direction opening side of a path, it has become a configuration, the bending vadium which has bent from the path to shaft orientations is formed in the paries medialis orbitae of the above-mentioned axial insertion section, and the above-mentioned shaft is characterized by having the projection which fits into the above-mentioned bending vadium.

[0008] In this invention, a shaft is inserted in the direction of a path from opening of direction one side of a path of the axial insertion section of a yoke so that the projection of a shaft may fit into the bending vadium of the paries medialis orbitae of the axial insertion section. When the projection of a shaft is guided from a path along with the bending vadium at shaft orientations and the projection of a shaft is guided even at the head of shaft orientations of the bending vadium at this time, the location of the shaft in axial insertion circles is decided, and it stops escaping from a shaft in the direction of a path from a yoke.

[0009] Therefore, according to this invention, it becomes unnecessary for an operator to hold the fitting condition of a shaft and a yoke by hand, and workability becomes good until it binds a yoke tight with a bolt. Moreover, a possibility of the axis of a shaft and a yoke shifting or inclining by the time it binds a bolt tight also disappears. Therefore, workability is good and can realize geometry of the shaft in which exact attachment is possible, and a yoke.

[0010]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of a graphic display explains this invention to a detail.

[0011] The gestalt of operation of the shaft of this invention and the geometry of a yoke is shown in drawing 1. The gestalt of this operation is equipped with the yoke 3 which has the axial insertion section 1 and the pin receptacle section 2 of the cross-section abbreviation configuration for U characters in which direction one side of a path is carrying out opening, and the shaft 5 inserted in this axial insertion section 1 as shown in drawing 2 (A) and (B).

[0012] The axial insertion section 1 has the bending vadium 8 and 10 of the shape of an abbreviation sector formed in both the paries medialis orbitae 6 and 7. These bending vadium 8 and 10 tapers off toward a pars basilaris ossis occipitalis 11 from the direction opening side of a path, has become a configuration, and has bent from the path to shaft orientations.

[0013] On the other hand, as shown in drawing 3 (A) and (B), the shaft 5 has become cross-section abbreviation ellipse-like, and has the up-and-down convex surfaces 5A and 5B and the flat sides 5C and 5D on either side. Moreover, this shaft 5 has projections 13 and 15 in the center of abbreviation of the flat sides 5C and 5D on either side. As shown in drawing 1, these projections 13 and 15 fitted in to the points 8A and 10A of the bending vadium 8 and 10 of the axial insertion section 1, and have achieved the duty it is made for a shaft 5 not to move to the direction of a path, and shaft orientations to the axial insertion section 1.

[0014] Next, with reference to drawing 4, the situation when inserting the shaft 5 of the above-mentioned operation gestalt in a yoke 3 is explained. This shaft 5 is inserted in the direction of a path toward a pars basilaris ossis occipitalis 11 from the opening side of a shaft 5 so that the projections 13 and 15 of the both sides of a shaft 5 may fit into the vadium 8 and 10 of the axial insertion section 1. At this time, the projections 13 and 15 of a shaft 5 are smoothly guided by the above-mentioned vadium 8 and 10 toward the points 8A and 10A at the head of shaft orientations, and a location becomes settled by reaching Points 8A and 10A, as eventually shown in drawing 1. Then, by inserting a bolt (not shown) in the bolthole 20 of a yoke 3, and performing bolting, the direction slot 21 of a path of a shaft 5 is made to carry out fitting of the above-mentioned bolt, and the shaft-orientations omission of a shaft 5 is thoroughly prevented at the same time it binds a shaft 5 tight in a yoke 3.

[0015] Thus, with this operation gestalt, it is tacking carried out of the shaft 5 to a yoke 3 by it before bolt conclusion at the same time a shaft 5 is guided by the bending vadium 8 and 10 formed in the axial insertion section 1 in the predetermined location in a yoke 3. Therefore, according to this operation gestalt, it becomes unnecessary for an operator to hold the fitting condition of a shaft 5 and a yoke 3 by hand, and workability becomes good until it binds a yoke 3 tight with a bolt. Moreover, a possibility of the axis of a shaft 5 and a yoke 3 shifting, or inclining by the time it binds a bolt tight also disappears. Therefore, workability is good and can realize geometry of the shaft in which exact attachment is possible, and a yoke.

[0016]

[Effect of the Invention] So that clearly as mentioned above, the shaft of this invention, and the geometry of a yoke The yoke which has the axial insertion section and the pin receptacle section of the cross-section the configuration of U characters in which direction one side of a path is carrying out opening, It is the geometry of a shaft and a yoke equipped with the shaft inserted in the above-mentioned axial insertion section. It tapers off toward a pars basilaris ossis occipitalis from the direction opening side of a path, it has become a configuration, the bending vadium which has bent from the path to shaft orientations is formed in the paries medialis orbitae of the above-mentioned axial insertion section, and the above-mentioned shaft has the projection which fits into the above-mentioned bending

vadum.

[0017] In this invention, it can tacking do of the shaft to a yoke before bolt conclusion by it at the same time a shaft is guided by the bending vadum formed in the axial insertion section in the predetermined location in a yoke. Therefore, according to this invention, it becomes unnecessary for an operator to hold the fitting condition of a shaft and a yoke by hand, and workability becomes good until it binds a yoke tight with a bolt. Moreover, a possibility of the axis of a shaft and a yoke shifting or inclining by the time it binds a bolt tight also disappears. Therefore, workability is good and can realize geometry of the shaft in which exact attachment is possible, and a yoke.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the fragmentary sectional view showing the gestalt of operation of the shaft of this invention, and the geometry of a yoke.

[Drawing 2] Drawing 2 (A) is half section drawing of the yoke of the above-mentioned operation gestalt, and drawing 2 (B) is drawing showing signs that the above-mentioned yoke was seen from shaft-orientations back.

[Drawing 3] Drawing 3 (A) is the front view of the shaft of the above-mentioned operation gestalt, and drawing 3 (B) is the side elevation of the above-mentioned shaft.

[Drawing 4] It is drawing showing signs that the shaft of the above-mentioned operation gestalt is inserted in a yoke.

[Drawing 5] It is a perspective view explaining the conventional shaft and the geometry of a yoke.

[Description of Notations]

1 [-- 6 A shaft, 7 / -- 8 The paries medialis orbitae, 10 / -- The bending vadum, 8A, 10A / -- A point, 11 / -- 13 A pars basilaris ossis occipitalis, 15 / -- Projection.] -- The axial insertion section, 2 -- The pin receptacle section, 3 -- A yoke, 5

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] The yoke which has the axial insertion section and the pin receptacle section of the cross-section the configuration of U characters in which direction one side of a path is carrying out opening, It is the geometry of a shaft and a yoke equipped with the shaft inserted in the above-mentioned axial insertion section. It is the geometry of a shaft and a yoke which it tapers off toward a pars basilaris ossis occipitalis from the direction opening side of a path, it has become a configuration, and the bending vadum which has bent from the path to shaft orientations is formed in the paries medialis orbitae of the above-mentioned axial insertion section, and is characterized by the above-mentioned shaft having the projection which fits into the above-mentioned bending vadum.

[Translation done.]

COUPLING STRUCTURE OF SHAFT AND YOKE

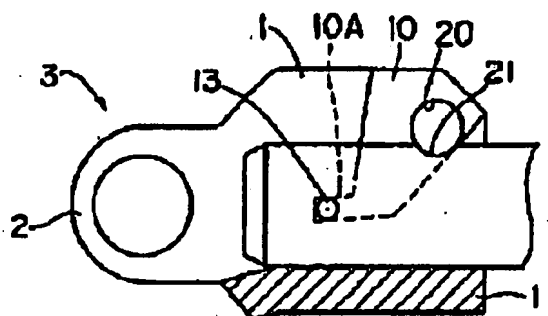
Patent number: JP2000297823
Publication date: 2000-10-24
Inventor: KAMIKAWA KAZUE; AOTA KENICHI
Applicant: KOYO SEIKO CO LTD
Classification:
- International: F16D1/06
- european:
Application number: JP19990106186 19990414
Priority number(s):

Report a data error here

Abstract of JP2000297823

PROBLEM TO BE SOLVED: To enable exact assembling with excellent workability.

SOLUTION: In a coupling structure of this shaft and yoke 3, an inside wall of a shaft inserting part 1 of the yoke 3 is tapered from a radial opening side toward a bottom part 11 and a bent shallow groove 10 bent from a radial direction in an axial direction is formed. The shaft has a projection 13 fitted into the bent shallow groove 10. In this structure, the shaft is guided to a prescribed position within the yoke 3 by the bent shallow groove 10 formed on the shaft inserting part 1, and at the same time, the shaft can be temporarily fastened on the yoke 3 till tightening of bolts.



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3

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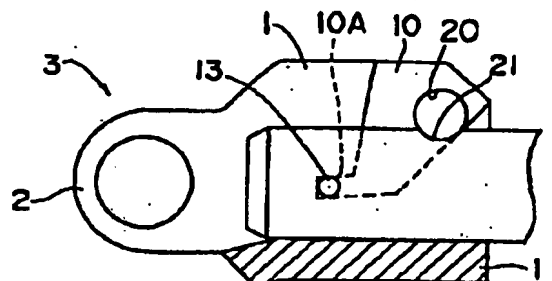
弁理士 青山 稔 (外1名)

(54) 【発明の名称】 軸とヨークの結合構造

(57) 【要約】

【課題】 作業性が良く、正確な組み付けが可能な軸とヨークの結合構造を提供する。

【解決手段】 この軸とヨークの結合構造は、ヨーク3の軸挿入部1の内側壁6, 7に、径方向開口側から底部11に向かって先細り形状になっていて、径方向から軸方向に折れ曲がっている折曲浅溝8, 10が形成されている。一方、軸5は、折曲浅溝8, 10に嵌り込む突起13, 15を有している。この構造では、軸挿入部1に形成した折曲浅溝8, 10によって、軸5がヨーク3内の所定位置に案内されると同時に、ボルト締結までの間、軸5をヨーク3に仮止めできる。



【特許請求の範囲】

【請求項1】 径方向片側が開口している断面U字形状の軸挿入部とピン受け部とを有するヨークと、上記軸挿入部に挿入された軸とを備える軸とヨークの結合構造であって、

上記軸挿入部の内側壁に、径方向開口側から底部に向かって先細り形状になっていて、径方向から軸方向に折れ曲がっている折曲浅溝が形成されており、
上記軸は、上記折曲浅溝に嵌り込む突起を有していることを特徴とする軸とヨークの結合構造。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、自在継手に適用される軸とヨークの結合構造に関する。

【0002】

【従来の技術】従来、たとえば、ステアリングジョイントにおける軸とヨークの結合構造では、軸を軸方向にスライドさせてヨーク内に挿入してから、ヨークに径方向に挿通させたボルトを締め、ヨークと軸を結合させるものがある。

【0003】また、図5に示すように、軸71をヨーク72に対して軸直角方向から径方向にスライドさせてヨーク72内に挿入する軸とヨークの結合構造もある。

【0004】ところが、後者の結合構造では、軸71をヨーク72内に嵌合させた後で、ヨーク72のボルト孔73、75に締め付けボルト(図示せず)を挿通させるから、このボルトを締め付けるまで、作業者が軸71とヨーク72との嵌合状態を保持しておく必要があり、作業性が悪いという問題がある。

【0005】また、ボルトを締め付けるまでの間に、軸71とヨーク72の軸芯がずれたり傾いたりする恐れもある。

【0006】

【発明が解決しようとする課題】そこで、この発明の目的は、作業性が良く、正確な組み付けが可能な軸とヨークの結合構造を提供することにある。

【0007】

【課題を解決するための手段】上記目的を達成するため、請求項1の発明の軸とヨークの結合構造は、径方向片側が開口している断面U字形状の軸挿入部とピン受け部とを有するヨークと、上記軸挿入部に挿入された軸とを備える軸とヨークの結合構造であって、上記軸挿入部の内側壁に、径方向開口側から底部に向かって先細り形状になっていて、径方向から軸方向に折れ曲がっている折曲浅溝が形成されており、上記軸は、上記折曲浅溝に嵌り込む突起を有していることを特徴としている。

【0008】この発明では、軸の突起が軸挿入部の内側壁の折曲浅溝に嵌まり込むように、軸をヨークの軸挿入部の径方向片側の開口から径方向に挿入する。このとき、軸の突起が折曲浅溝に沿って径方向から軸方向に案

内され、軸の突起が折曲浅溝の軸方向先端にまで案内されたときに、軸挿入部内での軸の位置が決まり、軸はヨークから径方向に抜けなくなる。

【0009】したがって、この発明によれば、ヨークをボルトで締め付けるまで、作業者が軸とヨークとの嵌合状態を手で保持しておく必要がなくなり、作業性が良くなる。また、ボルトを締め付けるまでの間に、軸とヨークの軸芯がずれたり傾いたりする恐れもなくなる。したがって、作業性が良く、正確な組み付けが可能な軸とヨークの結合構造を実現できる。

【0010】

【発明の実施の形態】以下、この発明を図示の実施の形態により詳細に説明する。

【0011】図1に、この発明の軸とヨークの結合構造の実施の形態を示す。この実施の形態は、図2(A)、(B)に示すように、径方向片側が開口している断面略U字形状の軸挿入部1とピン受け部2とを有するヨーク3と、この軸挿入部1に挿入された軸5とを備える。

【0012】軸挿入部1は、その両内側壁6、7に形成された略扇形状の折曲浅溝8、10を有している。この折曲浅溝8、10は、径方向開口側から底部11に向かって先細り形状になっていて、径方向から軸方向に折れ曲がっている。

【0013】一方、図3(A)、(B)に示すように、軸5は、断面略小判形状になっていて、上下の凸曲面5A、5Bと左右の平坦面5C、5Dを有する。また、この軸5は、左右の平坦面5C、5Dの略中央に突起13、15を有している。この突起13、15は、図1に示すように、軸挿入部1の折曲浅溝8、10の先端部8A、10Aまで嵌まり込んで、軸5が軸挿入部1に対して径方向および軸方向に移動しないようにする役目を果たしている。

【0014】次に、図4を参照して、上記実施形態の軸5をヨーク3に嵌め込むときの様子を説明する。この軸5は、軸5の両側の突起13、15が軸挿入部1の浅溝8、10に嵌るように、軸5の開口側から底部11に向かって径方向に差し込まれる。このとき、軸5の突起13と15は、上記浅溝8と10によって、軸方向先端の先端部8A、10Aに向かって滑らかに案内され、最終的に図1に示すように先端部8A、10Aに到達することで位置が定まる。その後、ヨーク3のボルト孔20にボルト(図示せず)を挿入してボルト締めを行うことで、ヨーク3で軸5を締め付けると同時に、軸5の径方向溝21に上記ボルトを嵌合させて、軸5の軸方向抜けを完全に防ぐ。

【0015】このように、この実施形態では、軸挿入部1に形成した折曲浅溝8、10によって、軸5がヨーク3内の所定位置に案内されると同時に、ボルト締結までの間、軸5がヨーク3に仮止めされる。したがって、この実施形態によれば、ヨーク3をボルトで締め付けるま

で、作業者が軸 5 とヨーク 3 との嵌合状態を手で保持しておく必要がなくなり、作業性が良くなる。また、ボルトを締め付けるまでの間に、軸 5 とヨーク 3 の軸芯がずれたり傾いたりする恐れもなくなる。したがって、作業性が良く、正確な組み付けが可能な軸とヨークの結合構造を実現できる。

【0016】

【発明の効果】以上より明らかなように、この発明の軸とヨークの結合構造は、径方向片側が開口している断面 U 字形状の軸挿入部とピン受け部とを有するヨークと、上記軸挿入部に挿入された軸とを備える軸とヨークの結合構造であって、上記軸挿入部の内側壁に、径方向開口側から底部に向かって先細り形状になっていて、径方向から軸方向に折れ曲がっている折曲浅溝が形成されており、上記軸は、上記折曲浅溝に嵌り込む突起を有している。

【0017】この発明では、軸挿入部に形成した折曲浅溝によって、軸がヨーク内の所定位置に案内されると同時に、ボルト締結までの間、軸がヨークに仮止めできる。したがって、この発明によれば、ヨークをボルトで締め付けるまで、作業者が軸とヨークとの嵌合状態を手

で保持しておく必要がなくなり、作業性が良くなる。また、ボルトを締め付けるまでの間に、軸とヨークの軸芯がずれたり傾いたりする恐れもなくなる。したがって、作業性が良く、正確な組み付けが可能な軸とヨークの結合構造を実現できる。

【図面の簡単な説明】

【図 1】 この発明の軸とヨークの結合構造の実施の形態を示す部分断面図である。

【図 2】 図 2 (A) は上記実施形態のヨークの半断面図であり、図 2 (B) は上記ヨークを軸方向後方から見た様子を示す図である。

【図 3】 図 3 (A) は上記実施形態の軸の正面図であり、図 3 (B) は上記軸の側面図である。

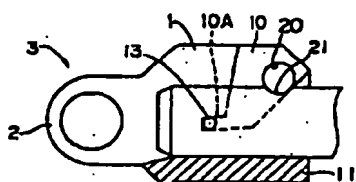
【図 4】 上記実施形態の軸をヨークに挿入する様子を示す図である。

【図 5】 従来の軸とヨークの結合構造を説明する斜視図である。

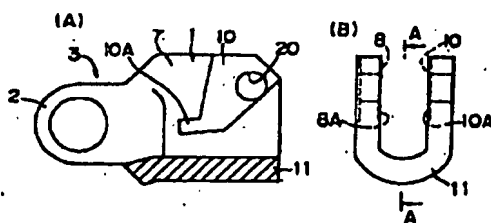
【符号の説明】

1…軸挿入部、2…ピン受け部、3…ヨーク、5…軸、6, 7…内側壁、8, 10…折曲浅溝、8A, 10A…先端部、11…底部、13, 15…突起。

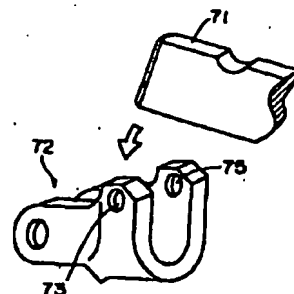
【図 1】



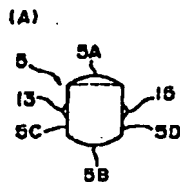
【図 2】



【図 5】



【図 3】



【図 4】

